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Patentanmeldung Nr. Patent application No. Demande de brevet n°

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An electric incandescent lamp with infrared reflecting layer

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**An electric incandescent lamp with infrared reflecting layer**

The invention is related to an electric incandescent lamp, in particular to an electric incandescent halogen lamp, comprising a light transmitting envelope, or bulb, being provided with an infrared reflecting layer, the envelope having a longitudinal axis, the lamp furthermore comprising a luminous member having two substantial parallel portions being positioned substantially parallel to said longitudinal axis.

US-A-5811934 describes an electric incandescent lamp. Thereby the shape of the envelope is designed in such a way, that the infrared radiation, emitted by the luminous member, is reflected back in the direction of that luminous member again.

The infrared reflecting layer, also called infrared radiation reflecting coating, can be present at the inner surface and/or at the outer surface of the envelope surrounding the luminous member, or it can be present at a part of that envelope. The infrared reflecting layer has the effect that at least a portion of the infrared radiation, produced by the luminous member, is reflected back into the envelope. The result is an increased lamp efficiency that can be used to increase the temperature of the luminous member and consequently the light flux, if the electrical power consumption is constant. On the other hand, a given light flux can be attained with less electrical power consumption providing an advantageous energy-saving effect. Another sometimes desired effect is that less infrared radiation power is emitted through the envelope, resulting in less heating of the environment.

An effective reflection of the infrared radiation is achieved when the reflected radiation is directed back to the surface of the luminous member. Therefore the shape of the portion of the envelope carrying the reflective layer should be adapted to the location of the luminous member inside the envelope.

The object of the invention is to provide an effective reflection in an electric incandescent lamp comprising a light transmitting envelope containing a luminous member having two parallel portions at a distance from each other.

To accomplish that object said envelope has, in a sectional view perpendicular to said longitudinal axis, substantially an elliptical shape with said two portions of the luminous member in both focal points of said elliptical shape. The part of the envelope having the elliptical shape, and the parallel portions of the luminous member, can extend over

an certain distance, so that said part of the envelope has the shape of a tube having an elliptical cross section, whereby both portions of the luminous member are positioned in the two focal lines within that tube. Thereby, the infrared radiation emitted by one of said portions of the luminous member will be reflected by the reflecting layer on the tube-like envelope to the other portion of the luminous member.

In one preferred embodiment the electric incandescent lamp is a halogen lamp.

Preferably, the luminous member is substantially U-shaped, whereby both limbs of the U-shape are positioned parallel to said longitudinal axis and are said two parallel portions of the luminous member. Thereby the ends of said limbs can be connected to external electrical contacts, which electrical contacts extend outside the envelope at one side of the lamp.

In case of a U-shaped luminous member, the base portion of it can be supported by a support element, which support element can be fixed at the side of the envelope where the electrical contacts are located.

In one preferred embodiment the luminous member is a coiled filament, i.e. a filament winded in a helical shape. Thereby the filament forming the luminous member can be made much longer than the luminous member itself, resulting in a higher voltage that can be applied to the luminous member. To achieve a longer filament, the luminous member can be a double coiled filament. Thereby a coiled filament (helical shaped filament) is coiled again into a helical shape having a greater diameter than the first mentioned helical shape.

In one preferred embodiment there are two envelopes, an inner envelope and an outer envelope, whereby one of the envelopes is provided with the infrared reflecting layer and has said elliptical shape. Preferably, the outer envelope is provided with the infrared reflecting layer.

Preferably, the infrared reflecting layer is applied to the inner wall of the envelope.

The invention will now be explained by means of two embodiments of an electric incandescent halogen lamp, in which reference is made to a drawing, in which:

Fig. 1 is a front elevation of the lamp;

Fig. 2 is a side elevation of the lamp;

Fig. 3 is a sectional view along the line III-III in figure 1; and

Fig. 4 shows the second embodiment.

The figures are schematic representations of the embodiments. The electric incandescent halogen lamp as shown in figures 1 and 2 is a lamp for general lighting purposes, which is suitable for direct connection to a 220 V mains. The longitudinal axis of the lamp is indicated with line 1. The transverse dimension of the lamp may be between 10 mm and 15 mm, and the overall length of the lamp can be approximately 45 mm.

The lamp has an envelope 2 made of transparent material such as quartz glass. The inner space 3 of the envelope 2 is filled with in a known way with an inert gas mixture, which is known per se, containing a conventional halogen additive. After the lamp is assembled the space 3 inside the envelope 2 is filled through a so-called exhaust tip 4 at the top of the envelope 2, which exhaust tip 4 is closed afterwards.

A luminous member 5 is located inside the envelope 2. The luminous member 5 has a U-shape with two parallel limbs 6, parallel to the axis 1 of the lamp, and a base portion 7. Apart from the ends of the two limbs 6, the luminous member is formed by a double coiled filament, also called a coiled coil filament. Thereby a coiled filament (helical shaped filament) is coiled again into a helical shape having a greater diameter than the first mentioned helical shape.

The ends of the two limbs 6 serve as electrical power supply leads 8 and extend in the pinch 9, which is a seal closing the envelope 2 hermetically at the lower side of the lamp. Said power supply leads 8 are connected to the ends of sealing foils 10 embedded in pinch 9. The other ends of sealing foils 10 are connected to contact pins 11, which are partly embedded in pinch 9 and partly projecting outside pinch 9. Electrical power can be supplied to the luminous member of the lamp through said contact pins 11, said sealing foils 10 and said leads 11, which is known per se in electric incandescent halogen lamps.

The space 3 in the envelope 2 furthermore comprise a support element 12, which is fixed in the pinch 9 at its lower end, and which is supporting the base 7 of the luminous member 5 at its other end, so that luminous member 5 is maintained in its U-shaped position as is shown in figure 1.

Luminous member 5 emits light radiation as well as infrared radiation. The purpose of the lamp is the radiation of light, and the infrared radiation is an unwanted effect. To reduce the infrared radiation of the lamp, the inner wall of envelope 2 is coated with an infrared radiation reflecting layer, so that the infrared radiation is, at least partly, kept inside the envelope 2. Thereby it is advantageous to direct the reflected infrared radiation towards

the luminous member 5, so that said radiation will supply additional heat to the luminous member 5.

To direct the infrared radiation of each of the limbs 6 of the luminous member 5 to the other limb 6, the shape of the envelope 2, in a sectional view perpendicular to longitudinal axis 1, is elliptical. Said elliptical shape is shown in figure 3, whereby both limbs 6 of the luminous member 5 are positioned in the focal points of the elliptical shape. This figuration of the envelope 2 and the limbs 6 has the effect that over a major portion of the light emitting part of the lamp the infrared radiation of each of the limbs 6 is directed to the other limb 6, resulting in a more efficient lamp.

Figure 4 shows a sectional view of another embodiment of an electric incandescent lamp, whereby two transparent envelopes are present, an inner envelope 15 and an outer an envelope 16. The outer envelope 16 is coated at its inner side with an infrared reflecting layer. Because the outer envelope 16 has an elliptical shape with the two limbs 6 of the luminous member 5 in the two focal points, the infrared radiation of one limb 6 will be directed to the other limb 6. Inner envelope 15 may have another shape, for example a circular sectional shape as shown in figure 4.

The application of a second envelope may be advantageous in case a usual lamp should become an increased efficiency, whereby that lamp is surrounded by the elliptical second envelope having an infrared reflecting layer. But the invention can also be applied in lamps having two envelopes around each other for other reasons.

The described embodiments of the electric incandescent lamp are merely examples; a great many other embodiments are possible.

## CLAIMS:

1. An electric incandescent lamp comprising a light transmitting envelope being provided with an infrared reflecting layer, the envelope having a longitudinal axis, the lamp furthermore comprising a luminous member having two substantial parallel portions being positioned substantially parallel to said longitudinal axis, characterized in that, in a sectional  
5 view perpendicular to said longitudinal axis, said envelope has substantially an elliptical shape with said two portions of the luminous member in both focal points of said elliptical shape.
2. A lamp as claimed in claim 1, characterized in that the lamp is an electric  
10 incandescent halogen lamp.
3. A lamp as claimed in any one of the preceding claims, characterized in that the luminous member is substantially U-shaped, whereby both limbs of the U-shape are positioned parallel to said longitudinal axis.  
15
4. A lamp as claimed in claim 3, characterized in that the ends of said limbs are connected to external electrical contacts.
5. A lamp as claimed in claim 3 or 4, characterized in that the base of the U-  
20 shaped luminous member is supported by a support element.
6. A lamp as claimed in any one of the preceding claims, characterized in that the luminous member is a coiled filament.
- 25 7. A lamp as claimed in any one of the preceding claims, characterized in that the luminous member is a double coiled filament.

8. A lamp as claimed in any one of the preceding claims, characterized by two envelopes, an inner envelope and an outer envelope, whereby one of the envelopes is provided with the infrared reflecting layer and has said elliptical shape.

5 9. A lamp as claimed in claim 8, characterized in that the outer envelope is provided with the infrared reflecting layer.

10. A lamp as claimed in any one of the preceding claims, characterized in that the infrared reflecting layer is applied to the inner wall of the envelope.



**ABSTRACT:**

An electric incandescent lamp comprising a light transmitting envelope (2) being provided with an infrared reflecting layer, the envelope (2) having a longitudinal axis (1). The lamp furthermore comprises a luminous member (5) having two substantial parallel portions (6) being positioned substantially parallel to said longitudinal axis (1). In a sectional  
5 view perpendicular to said longitudinal axis (1), said envelope (2) has substantially an elliptical shape with said two portions (6) of the luminous member (5) in both focal points of said elliptical shape.

Fig. 1

1/2

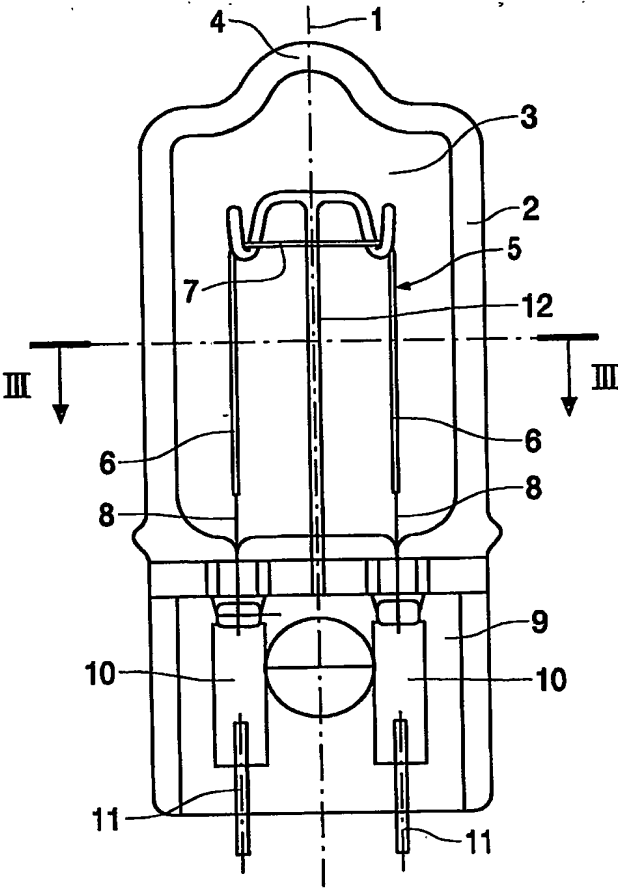


FIG. 1

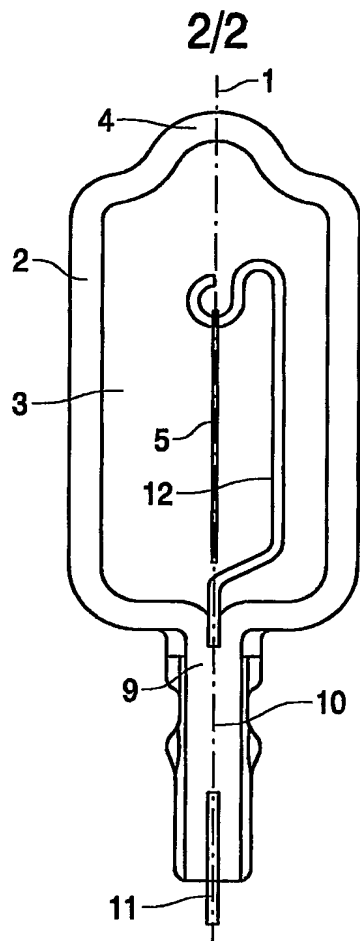


FIG. 2

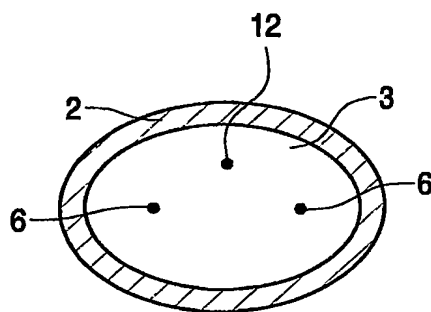


FIG. 3

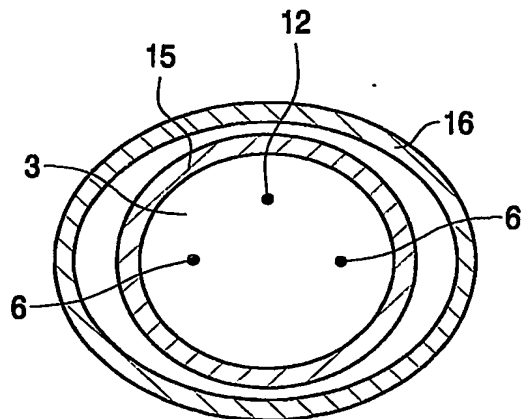


FIG. 4

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